

REMARKS

Claims 3, 6 and 13-24 were previously withdrawn. Claims 1, 2, 4, 5 and 7-12 are thus currently pending reconsideration.

35 U.S.C. § 103 (a) Rejections – Obviousness (Perry et al. and Schmidt)

Claims 1-2, 4-5 and 7-12 are rejected as obvious with respect to US 4776171 to Perry et al. (the '171 patent) in view of US 3,243,259 (sic) to Schmidt. See Office Action, p. 2. Applicants respectfully point out that Schmidt is actually US 3,243,359, (hereinafter "the '359 patent") and NOT US 3,243,259.

The Office Action states that Perry et al. does not disclose the concept of using both the electricity and the waste heat for driving a water distillation system (see Office Action, p. 2). Applicants agree. Nowhere does Perry et al. ever disclose both using electricity for driving a water distillation system and waste heat from the same thermal cycle engine to heat a water distillation system. More importantly, nowhere does Perry et al. disclose both (1) using electricity from a thermal cycle engine for driving a water distillation system and (2) conveying waste heat from the same thermal cycle engine for driving the reverse osmosis purification of water disclosed therein. The Office Action goes on to state that "it would have been obvious ... to use the electricity and the waste heat in Perry et al. for driving the water distillation system as taught in Schmidt instead of a water purification system for the purpose of making potable water. *Id.*, page 2, last line through p. 3, line 4. Applicants respectfully disagree, for at least two reasons.

First, as in Perry et al., nowhere does Schmidt disclose or suggest both (1) using the electrical capacity of the electric current generator **15**, whose power is supplied by turbine **4**, and (2) conveying waste heat from turbine **4** for powering the sea distillation unit disclosed therein. Rather, the '359 patent uses the turbine **4** for powering the compressors **1** and **2** and for powering the electric current generator, but discloses using the waste heat from burner **3**, *not* waste heat from turbine **4**, for heating the evaporators **5**¹ and **6**¹ of the waste heat receptors **5** and **6** in the distillation process. In fact, nowhere does Schmidt disclose or suggest connecting/feeding the electrical capacity from the electric current generator **15** into the distillation system or even discuss such a design as an option.

The '359 patent simply discloses a closed-circuit thermal power plant which uses gaseous working medium wherein a "turbine 4 drives the compressor 1 and at the same time supplies useful power to an electric current generator" (see Schmidt, col. 1, lines 59-61). Then, the "working medium compressed in the compressor 1 passes ... to the heater 3, in which it is heated by heat supplied externally by means of heat-exchanger partitions. The working medium thus heated passes ... to the turbine 4, in which it is expanded while doing work." (*Id.*, lines 40-47). The heated expanded working medium then passes to waste heat receivers 5 and 6 and the "waste heat given off by the working medium in the waste heat receivers 5 and 6 is utilized in a sea distillation plant" (*see id.*, lines 67-69).

Therefore, since neither Perry et al. nor Schmidt disclose both using electricity from a thermal cycle engine to drive the reverse osmosis process (the '171 patent) or the water distillation system (the '359 patent) and conveying waste heat from the *same* thermal cycle engine to supply heat to the water purification unit, combining the two references, even if the reverse osmosis process of the '171 patent is replaced with the water distillation process of the '359 patent, does not produce the currently claimed invention .

Second, Perry et al. discloses an integrated power system located to an adjacent body of saline water that includes both a solar powered and a wind driven engine. See Perry et al., Abstract and throughout. Wind power drives the electric generator to produce electricity. Solar power generates the heat needed to drive a *low-heat* engine (water pump) that employs Freon or other volatile gases with low heats of evaporation are used as the working fluid that drives the pump, wherein the working fluid in the pump is volatilized by solar heated water in the low-heat engine. When there is not enough wind, a combustion engine that burns methanol drives the electric generator. When there is not enough sun, waste heat from the same combustion engine provides the heat to drive the low-heat engine. (See Figure 2). The methanol used in the combustion engine is produced from syngas, which in turn is produced from H₂ that is generated by electrolysis of the purified water.

Nowhere in Perry et al. is the electricity that is generated by wind power (or combustion of methanol) used to purify water, and it is never suggested. However, replacing the reverse osmosis process of the '171 patent with the water distillation process of the '359 patent would also require replacement of the low-heat engine with a high-heat engine, because water distillation is a heat intensive process. But Perry et al. does not suggest adding additional

electricity from the electric generator (powered either by wind or the combustion of methanol) to the waste heat from the combustion engine and solar heat to purify water.

As exemplified by currently pending claim 1, the presently claimed invention recites a method (and/or system) for removing contaminants from water by “driving an electric generator by means of a thermal cycle engine for generating electrical power capacity, the thermal cycle engine including a burner for combusting fuel; and employing ... the electrical power capacity of the electric generator for powering a water distillation unit ... and conveying heat output of the thermal cycle engine ... to the distillation unit ... to reduce the amount of electrical power required to purify the water” (see e.g. claim 1).

Combining Perry et al. with Schmidt, even if theoretically possible, will not provide the claimed invention, because a combination of the ‘171 patent with the ‘359 patent does not yield a system that both employs electrical power capacity, generated by a thermal cycle engine that drives an electric generator, *and* conveys waste heat output of the same thermal cycle engine for supplying heat to a water distillation unit. Moreover, neither reference discloses, or suggests, modifying the design and source of power for the water purification system, to provide electrical power capacity of an electric generator for powering the water purification elements of the disclosed systems. In both the ‘171 patent and the ‘359 patent, the electricity generated by the solar, wind or tide power (the ‘171 patent) or the turbine (the ‘359 patent) is never used to power the water purification system, whether it is reverse osmosis (the ‘171 patent) or water distillation (the ‘359 patent).

Therefore, Applicants respectfully submit that the presently claimed invention is not obvious in view of the combination of Perry et al. and Schmidt because, to the extent one might combine Perry et al. and Schmidt, the resulting combination simply would not include all the elements of the presently claimed invention, and neither reference teaches, or suggests, modifying Perry et al. to add electricity and waste heat from the same thermal cycle engine to drive water purification in general, and water distillation specifically. For at least those reasons, Applicants respectfully submit that the pending claims are not obvious with respect to the ‘171 patent in view of the ‘359 patent, and request withdrawal of the obviousness rejections under 35 U.S.C. § 103(b) based on the ‘171 patent in view of the ‘359 patent.

35 U.S.C. § 103 (a) Rejections – Obviousness (Kamen et al. and Schmidt)

Claims 1-2, 4-5 and 7-12 are also rejected as being obvious with respect to US 6,536,207 to Kamen et al. (hereinafter “the ‘207 patent” in view of US 3,243,259 (sic) to Schmidt (“the ‘359 patent”). See Office Action, p. 3.

As stated in the Response filed February 6, 2006, the ‘207 patent to Kamen et al. discloses an auxiliary power system for providing electrical power, not for removing contaminants from water by distillation, as claimed in the instant application, and includes an external combustion engine coupled to a generator, with both being disposed within a housing. The thermal energy generated by the external combustion engine may be used to heat the atmosphere surrounding the housing (see the Abstract of the ‘207 patent, and throughout the disclosure).

In contrast, as stated above, the presently claimed invention is directed to a method for removing contaminants from (or system for purifying) water by distillation, wherein by the distillation is powered by electrical power capacity produced by a thermal cycle engine, and “employing ... the electrical power capacity of the electric generator for powering a water distillation unit ...and conveying heat output of the thermal cycle engine ... to the distillation unit ... to reduce the amount of electrical power required to purify the water” (see e.g. claim 1). Thus, contrary to what is disclosed in the ‘207 patent, claims 1, 7 and 8 of the instant application instead recite that the heat output from the thermal cycle engine is used to heat the water purification unit, not to heat the atmosphere surrounding the housing of an auxiliary power system.

As detailed above, the ‘359 patent to Schmidt discloses a closed-circuit thermal power plant which uses gaseous working medium wherein a turbine drives a compressor and at the same time supplies useful power to an electric current generator (see Schmidt, col. 1, lines 59-61) wherein the working medium is compressed and passes to a heater where it is heated by heat supplied externally, after which it passes to the turbine again where it is expanded. After this, the heated expanded working medium passes to waste heat receivers wherein the heat is utilized in a sea distillation plant (see Col. 1). There is no suggestion in either the ‘207 patent or the ‘359 patent to combine them. And, if the combination is made, all the elements of independent claims

1, 7 and 8 are not present in the combination, because neither teaches using electricity from a thermal cycle engine to power a distillation unit, and also conveying heat output from the same thermal cycle unit for supplying heat to the water distillation unit. Therefore, Kamen et al. with Schmidt, like the proposed combination of Perry et al. with Schmidt, would not result in the presently claimed invention even if combined.

Also, as stated above for the Perry et al./ Schmidt combination, there is no suggestion in either Kamen et al. or Schmidt, or the knowledge generally available in the art, to modify the disclosure of the '207 and '359 patents to arrive at method for removing contaminants from water by distillation wherein electricity from a thermal cycle engine is used to drive the distillation unit, and wherein heat output of the same thermal cycle engine is used for supplying heat to the water distillation unit. Any such modification would be by hindsight based on the teachings of the subject patent application.

Applicants therefore respectfully submit that the pending claims are not obvious with respect to the '207 patent in view of the '359 patent, and request withdrawal of the obviousness rejections under 35 U.S.C. § 103(b) based on the '270 patent in view of the '359 patent

CONCLUSION

For at least the reasons detailed above, Applicants respectfully submit that all claims presently in the application are believed to be allowable over the art of record and early notice to that effect is respectfully solicited.

Applicants request that deposit account number 19-4972 be charged for any fees that may be required for the timely consideration of this application, including the fee for the Request for Continued Examination filed herewith. Applicants believe that no additional fees are required; however, if any additional fees are required for the timely consideration of this application, please charge deposit account number 19-4972. The Examiner is requested to telephone Barbara J. Carter at the phone number listed below if any matters remain outstanding so that they may be resolved expeditiously.

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